TEXT REQUIREMENTS AND GUIDELINES

AGU uses an entirely electronic process for submission, review, and publication.

To make the preparation of your paper as efficient and economical as possible, we ask that you follow AGU's Grammar and Style Guide.

For submission we prefer to receive your manuscript in one of the following formats: Microsoft Word, LaTeX, or PDF. Figures and tables should be submitted as part of the main file.

If you are submitting separate files for images or supporting information, please see our list of Acceptable File Formats for guidance.

MANUSCRIPT SUBMISSION TYPES

The AGU Editorial Style Guide for Authors provides a list of the most frequent changes made in editing. The complete AGU Grammar and Style Guide is available for download.

	MS Word	LaTeX
Format	.docx is preferred, but .doc is acceptable	AGU Template and style files. See LaTeX guidelines for templates and macros.
Font/type	12-pt Times New Roman	
Language	U.S. English	
Paragraphs	Indent or space between them	
Footnotes	Only use in tables and for affiliations. Incorporate potential footnotes intomain text, if needed.	
Units of measure and chemical elements	Do not use italic font for units of measure or chemical elements.	
Math, both inline and full equations	**Use a program, such as MathType, that will produce**	Avoid special style macros

	editable equations.	

INSTRUCTIONS FOR WORD USERS

Word 2007 and 2010 files (.docx) are accepted, as are papers written in earlier versions of Word.

Where possible, create equations using MathType or another equation builder rather than the native equation editor in Word.

LATEX GUIDELINES FOR TEMPLATES AND MACROS

For LaTeX, use the AGU template. Please DO NOT introduce into your files any extraneous formatting, new commands, macros, or shortcuts, as they are not compatible with the publishing process. Submitting files with these macros will require AGU to manually key information, which can introduce errors and prolong the time it takes to publish your work.

Because of this, regrettably, submitted papers with extensive extraneous formatting, macros, or shortcuts (including \def,\newcommands, \renewcommands, and especially those commands with #) will be sent back to the author for correction.

It is acceptable to use the following:

\ref and \label for figures, tables, and equations and \cite commands for reference citations.

The following AGU LaTeX manuscript preparation files are included: the AGU template, AGU style file, AGU class file, BibTeX files, and PDF and tex versions of AGU's LaTeX instruction manual for authors.

- AGU's template, agutmpl.tex, is simple to use. Insert the letter code for the appropriate journal at the \documentclass level. Please do not use original templates.
- AGU's LaTeX style file, agutex.cls, has been designed to provide authors with advanced formatting capabilities in a single user-friendly style file. It is not necessary to use different style files for different journals.
- Additional information and instructions are provided for special characters and formatting. Also see the LaTeX Formatting Toolkit.

Special BibTeX Instructions

1. Run LaTeX on your LaTeX file.
2. Run BibTeX on your LaTeX file.
3. Open the newly created .bbl file containing the reference list and copy all of the contents into your LaTeX file after the acknowledgments section.
4. Comment out the old \bibliographystyle and \bibliography commands.

5. Run LaTeX on your new file before submitting.
   Failure to follow these instructions will require information to be keyed manually, which can introduce errors and prolong the time it takes to publish your work.

   When you submit your LaTeX document:

- Submit in draft mode. Draft mode produces a double-spaced copy with a time and date of production stamp at the bottom. Figures and tables are positioned at the end of the file in this mode.
- Use line numbering.
- Comment out any graphics (e.g., \includegraphics, \figbox).
- Submit figures separately. See Acceptable File Formats for what file types can be used.
- For displayed equations, make sure that they break before the margins.
- Insert \end{article}command after \end{thebibliography} so that captions and tables are included in the output.

MANUSCRIPT ELEMENTS

Authors are asked to provide manuscripts and artwork as electronic files. For more information, see Acceptable File Formats.

The manuscript should be arranged in the following order:

1. Title page including authors' names, affiliations, and mailing address for corresponding author (including postal code)"
2. Key Points
3. Abstract
4. Index Terms and Keywords
5. Text (including appendices)
6. Acknowledgments
7. References
8. Tables
9. Figures
10. Copyrighted material permission
11. Supporting information/nonprint material (e.g., data sets, long tables, appendices, graphs).

1. Title/Authors

Title. A title should be specific, informative, and brief. Write it out without abbreviations. Use abbreviations in the title only if the abbreviation will be defined in the abstract.

Authors. Authors are individuals who have significantly contributed to the research and preparation of the article; all coauthors share responsibility for submitted articles. List each author name separately; a group cannot be listed as an author. Groups and other contributors who do not meet the authorship criteria should be appropriately

acknowledged in the acknowledgments section. It is critical to have full and complete information, including affiliations for all authors and the postal address for the corresponding author, to facilitate indexing and full citations. For example:

Christopher R. Schwalm and Christopher A. Williams, Graduate School of Geography, Clark University, Worcester, Massachusetts, USA.

Kevin Schaefer, National Snow and Ice Data Center, University of Colorado Boulder, Boulder, Colorado, USA.

Corresponding author: C. R. Schwalm, Graduate School of Geography, Clark University, Worcester, MA 01610, USA. (cschwalm@clark.edu)

2. Key Points

Key Points convey the main points of the article as well as potentially stating conclusions. Up to three key point statements are allowed per article, and each must be 80 characters or less. with no punctuation. All characters in key points must be from the main ASCII table, not the extended ASCII table. At least one key point is required per article. For example,

Key points

- Aerosol-cirrus interactions are simulated in a global climate model
- Mineral dust and black carbon aerosol can affect cirrus globally
- Cirrus ice types generated by different aerosol types are characterized

3. Abstract

The purpose of the abstract is twofold: (1) state the nature of the investigation and (2) summarize the important conclusions of this investigation. The abstract should be suitable for separate publication in an abstract journal and be adequate for indexing. Make sure to check for the following:

- It is set as a single paragraph.
- It is limited to 250 words for all journals except GRL where the limit is 150 words.
- It does not include table or figure mentions.
- If it has reference citations that are part of the sentence, they should be in roman type and have parentheses around the year; parenthetical reference citations will be deleted.
- All abbreviations used in the abstract are defined.

4. Index Terms and Keywords

Index terms are a key part of AGU's strategy for electronic distribution of journal articles.

Up to five index terms are allowed and should be provided at the time of submission. Use the AGU Index Set. Do not use terms ending in "00."

Authors may also provide up to six keywords. These are free-form terms that can be used to facilitate online searches. Keywords should not be article types (regular, correction, brief, etc.).

5. Text

Text should be fully edited when submitted to the GEMS system. Accepted papers are not rough drafts. The following categories will help you format different parts of the paper.

Headings. Except for very short manuscripts (such as comments and replies), the text should be divided into sections, each with its own heading.

Sections are numbered with Arabic numerals (1, 2, 3, etc.). A maximum of four levels of heads may be used, with subsections numbered 1.1., 1.2.; 1.1.1., 1.2.1; 1.1.1.1., and so on. Headings should be sentence fragments and do not begin with a lowercase letter or number. They should not include parenthetical reference citations or table and figure callouts.

Footnotes. Incorporate footnoted information into text; footnotes are used only for affiliations, tables, and auxiliary material.

Reference citations. Use name-date format, not numbered references, and enclose citations in brackets with authors in italics.

- [Smith et al., 2009] or
- Smith et al. [2009]

Mathematics. If your article contains math, pay particular attention to breaks in the displayed equations.

AGU encourages authors to use MathType or another equation builder compatible with MathML for ease of editing and production.

- Use italic for variables, bold for vectors and matrices, script for transforms, and sans serif for tensors.

Example of a vector: $\mathbf{J} \times \mathbf{B} / eN$

Example of a Matrix: $\mathbf{A} = \begin{bmatrix} a & \mathrm{c} \\ b & \mathrm{d} \end{bmatrix}$

Example of a transform: $\mathcal{L} = \{\mathrm{f}(\mathrm{t})\}$

Example of a tensor: $\sigma = \left[\mathbf{T}^{(\mathbf{e}_1)}\mathbf{T}^{(\mathbf{e}_2)}\mathbf{T}^{(\mathbf{e}_3)}\right]$

- Use superscripts and subscripts in superior or inferior position; do not use raised and lowered fonts.

  Examples: R^2, not R^2; B_y, not B_y

- Extend fraction bars under the entire length of the numerator.
- Use the "degree" symbol instead of superscript lowercase "o."

  Example: 30°E, not 30°E.

- Use "exp" rather than "e" if the argument of an exponential function is complicated or lengthy.

  Example: $\varphi(x2) = \varphi(x1) + \{\exp[a + (b + 1)x1] - \exp[a + (b + 1)x2]\}/(b + 1)$

- Avoid awkward fractional composition by using negative powers.

  Example: $(a + by - c + d + tv)^{-1}$,

  not $\dfrac{1}{a + bu - c + d + tv}$

- Use shilling fractions (l/r) in text.

  Example: (r sin x)/t, not $\dfrac{r \sin x}{t}$.

- Use the following to avoid ambiguity
  - In math: parentheses, brackets, and braces, in that order { [( )] }.

    Example: $\varphi(x2) = \varphi(x1) + \{\exp[a + (b + 1)x1] - \exp[a$

    $+ (b + 1)x2]\}/(b + 1)$

  - In text, use only parentheses, e.g., (dogs (or cats) appear).

Number displayed equations consecutively within the article, not within the section. Place the equation number (in parentheses) to the right of the equation. Reaction numbers should be set to the left of the equation and preceded by "R."

Equations in each appendix must be numbered separately, with the number preceded by the appendix letter (e.g., in Appendix A, the first equation would be (A1)).

Add one extra line space above and below all displayed equations.

Example of equations:

$$\frac{\partial \mathbf{B}}{\partial t} = -\nabla \times \mathbf{E} \qquad (1)$$

$$\varepsilon_{\perp} \frac{\partial \mathbf{E}_{\perp}}{\partial t} = \frac{1}{\mu_0} \left(\nabla \times \mathbf{B} \right)_{\perp} \quad (2)$$

Example of reaction:

(R30a) $HO_2 + NO \rightarrow OH + NO_2$

Notation. The notation is a list of parameters and their definitions that are used in the text. They should be set up as shown in the following sample. Including a notation section is not mandatory, but all parameters should be defined in the text. A notation section is preferred in a manuscript with heavy use of mathematics.

c rate of soil accumulation, m/yr.

d median grain size of water-deposited material, μm.

D distance of the locus of points, m.

h elevation of the rock stream channel at a particular time ti, m.

6. Acknowledgments

Acknowledgments should be limited to collegial and financial assistance. Acknowledgments are not meant to recognize personal or manuscript production support.

Acknowledgments must be one paragraph, except for JGR-Space Physics, Geophysical Research Letters, and Reviews of Geophysics, which have Editor acknowledgments that should be in a separate paragraph. If the paper has a contribution number, it should be the last item in the acknowledgments.

Honorofics such as Dr., Ms., etc., are not used; include first name or initial and last name.

Example:This work was supported by NSF grant AGS1012665 to Texas A&M University. I thank A. Evan, J. Fasullo, D. Murphy, K. Trenberth, M. Zelinka, and A. J. Dessler for useful comments.

7. References

All sources cited in text, tables, and figures must appear in the reference list, and all entries in the reference list must be cited in text. References that are only cited in auxiliary material should not be included in the reference list of the paper but should be included in a separate reference list in the readme file for the auxiliary material. This section explains and gives examples for different elements of references:

- text citations
- reference list
- DOI
- reference examples for different media.

Text citations. References should be cited in one of two ways in text using author name(s) and the date of publication:

"in earlier studies [Johnson, 2009]" or "…as given by Johnson and Smith [2008]."

Note that author names are italicized and that a comma follows the author name(s) if the reference is enclosed in brackets.

For references by three or more authors, use et al. after the first author: [Zhang et al., 2005]

- If a parenthetical citation includes two or more papers, separate the citations with a semicolon: [Forbes et al., 1999; Hausler and Wu, 2001].
- If two or more citations by the same author(s) are listed consecutively, they should be combined: [Jones, 1999, 2001; Jones and Tuller, 2003, 2004; Jones et al., 2006, 2008].
- If a parenthetical citation includes two or more papers, separate the citations with a semicolon: [Forbes et al., 1999; Hausler and Wu, 2001].
- If two or more citations by the same author(s) are listed consecutively, they should be combined: [Jones, 1999, 2001; Jones and Tuller, 2003, 2004; Jones et al., 2006, 2008].
- To distinguish two or more papers by the same author(s) published in the same year, add a, b, c, etc., after the year: [Park, 1995a,1995b; Park et al., 2001a, 2001b, 2001c]; the corresponding letter should also appear with the date in the reference list.

Authors may be treated either as a person or as a work (i.e., both "in Taylor [1984]" and "in the work by Taylor [1984]" are acceptable).

There are a limited number of words and phrases that can be used within brackets beyond the citation itself. Words that can precede the reference within brackets include the following: see, e.g., cf., from, after, i.e.

These words or phrases can be used after the reference within brackets: and references therein, pp., equation, chapter, paragraph (for AGU journals published after 2002), Table, Figure, ff., hereinafter (plus abbreviation), this study.

Reference list. Reference entries should be ordered alphabetically by the last name of the first author.

AGU follows a strict letter-by-letter alphabetization, e.g., Lefer before Le Pichon and Sanders before St. Amant.

- Only the first author's initials and last name are given in reverse order.
- A publication date must be given for each reference. For a Papers in Press article, use the current year as the date.

List references by the same first author in the following order:

1. first author alone, chronologically;

Smith, R. (2000a), ….

Smith, R. (2000b), ….

Smith, R. (2003), ….

2. with one coauthor, alphabetically by coauthor and then chronologically;

Smith, R., and L. A. Frank (1998), ….

Smith, R., and F. A. Allen (2001), ….

Smith, R., and L. A. Frank (2001), ….

3. with two or more coauthors, chronologically only.

Smith, R., and D. H. Roberts (2005)

Smith, R., D. H. Roberts, and J. Jones (1998), ….

Smith, R., F. A. Allen, and T. L. Baker (1999), ….

Smith, T. (1998), ….

Alphabetize different first authors having the same last name according to the initials of their first names. Note the use of lowercase letters to allow differentiation of text citations of work published in the same year.

DOI. The Digital Object Identifier (DOI) is a system for identifying and exchanging intellectual property in the digital environment. The DOI is a required part of the citation for AGU journal articles. This practice began at AGU in 2002. When they are known, DOIs should be included for non-AGU publications.

Here is an example of a DOI from a Journal of Geophysical Research-Atmospheres article (prior to 2013): doi:10.1029/2004JD005720

Examples of common references. The following are examples of the most commonly cited reference types, their basic elements, and a specific example.

Article in journal

• Authors, publication date, article title, journal, volume, and pages/citation number must be included.

Deng, A., and D. R. Stauffer (2006), On improving 4-km

mesoscale model simulations, J. Appl. Meteorol. Climatol., 45(3), 361–381, doi:10.1175/JAM2341.1.

Fang, X., M. W. Liemohn, A. F. Nagy, J. G. Luhmann, and Y.

Ma (2009), On the effect of the Martian crustal magnetic field on atmospheric erosion, Icarus, doi:10.1016/j. icarus.2009.01.012, in press.

Wang, C. (2005), A modeling study of the response

of tropical deep convection to the increase of cloud condensational nuclei concentration: 1. Dynamics and microphysics, J. Geophys. Res., 110, D21211, doi:10.1029/2004JD005720.

Yum, S. S., and J. G. Hudson (2002), Maritime/continental

microphysical contrasts in stratus, Tellus, Ser. B, 54, 61–73.

Book

• Authors, publication date, book title, publisher, and publisher's location must be included.

• To cite an entire edited volume, use the editors as the authors, as shown below.

• Include book series and volume number when applicable.

de Marsily, G. (1986), Quantitative Hydrogeology:

Groundwater Hydrology for Engineers, Academic, San Diego, Calif.

Klotz, S., and N. L. Johnson (Eds.) (1983), Encyclopedia of

Statistical Sciences, John Wiley, Hoboken, N. J.

Tape, W. (1994), Atmospheric Halos, Antarctic Res. Ser.,

vol. 64, AGU, Washington, D. C.

Chapter in book

• Authors, publication date, chapter title, book title (preceded by “in”), chapter pages, publisher, and publisher’s location must be included.

• Include editors and book series and volume number when applicable.

Langmuir, C. H., E. M. Klein, and T. Plank (1992),

Petrological systematics of mid-ocean ridge basalts: Constraints on melt generation beneath ocean ridges, in Mantle Flow and Melt Generation at Mid-Ocean Ridges, Geophys. Monogr. Ser., vol. 71, edited by J. Phipps Morgan et al., pp. 183–280, AGU, Washington, D. C.

Tapley, B. D., and M.-C. Kim (2001), Applications to geodesy,

in Satellite Altimetry and Earth Sciences: A Handbook of Techniques and Applications, edited by L.-L. Fu and A.Cazenave, pp. 371–406, Academic, San Diego, Calif.

Reports and Maps

• Authors, publication date, report/map title, publisher/sponsor, and publisher’s location must be included.

• If the report or map has a number/ designator, it should be included (in italics).

• If a report is not readily available to readers, it should be cited in text only as unpublished material.

• Chapters in a larger report can be cited as shown below.

Bentor, Y., and A. Vroman (1960), Arava Valley, with

explanatory text, in The Geological Map of the Negev, rev.

ed., sheet 19, scale 1:1,000,000, Isr. Geol. Surv., Jerusalem.

Brown, R. J. E. (1967), Permafrost in Canada, Map 1246A,

Geol. Surv. of Can., Ottawa, Ont. Moridis, G. J. (1998), A set of semianalytical solutions for parameter estimation in diffusion cell experiments, Rep. LBNL-41857, Lawrence Berkeley Natl. Lab., Berkeley, Calif.

Trask, N. J. (1986), Size and spatial distribution of craters

estimated from Ranger photographs, in Ranger 8 and 9 Analyses and Interpretation, Tech. Rep. 32-800, pp. 251–260, Jet Propul. Lab., Pasadena, Calif.

Thesis

• Authors, publication date, thesis title, thesis designator (including degree), institution, and institution's location must be included.

Brittle, K. F. (2001), Vibroseis deconvolution: Frequency-

domain methods, M.S. thesis, Dep. of Geol. and Geophys., Univ. of Calgary, Calgary, Alberta, Canada.

Conference paper

• Authors, meeting date, title of paper presented, name of meeting (preceded by "paper presented at"), meeting sponsor, and location of meeting are required.

• Conference proceedings published as books or in journals should be formatted as those types.

• When possible, avoid citing conference papers older than 2 years; instead, cite published book

or journal articles that resulted from the research presented at the conference.

Khain, A., A. Pokrovsky, U. Blahak, and D. Rosenfeld (2008),

Is the dependence of warm and ice precipitation on the aerosol concentration monotonic?, paper presented at 15th International Conference on Clouds and Precipitation, Int. Comm. on Clouds and Precip., Cancun, Mexico.

Smith, E. A., Z. S. Haddad, S. Tanelli, and G. J. Tripoli

(2008), Advancements in NEXRAD in Space (NIS), paper presented at 28th Conference on Hurricanes and Tropical Meteorology, Am. Meteorol. Soc., Orlando, Fla.

Eos. Use Eos Trans. AGU as the publication title. Note format for meeting abstracts published in supplements to Eos.

Faustini, J. M., P. R. Kaufmann, A. T. Herlihy, and

S. G. Paulsen (2009), Assessing stream ecosystem condition in the United States, Eos Trans. AGU, 90(36), 309–310.

Nagle, A. N., R. C. Pickle, A. E. Saal, E. H. Hauri, and D. W.

Forsyth (2007), Volatiles in basalts from intra-transform spreading centers: Implications for melt migration models, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract DI43A-05.

Unpublished Material. Refer to published sources rather than unpublished material whenever possible. References to papers in preparation, preprints, submitted articles, Websites, and other ephemeral material should appear in text only, not in the reference list. Format as follows.

Integrated with text:

B. L. Smith (unpublished data, 2008) available from the U.S.

Geological Survey (http://www.usgs.gov/)

Parenthetical:

(D. B. G. Collins and R. L. Bras, Climatic and ecological

controls of equilibrium drainage density, relief, and

channel concavity in drylands, submitted to Water Resources Research, 2009)

(J. G. Jones, manuscript in preparation, 2009)

8. Tables

Title. Every table must have a unique title. Titles should be clear and concise, and they should not be complete sentences. Explanatory information and definitions should be included in a footnote to the title.

Column heads. All columns (except the first one) must have headings. Column headings must be arranged so that their relation to the data is clear and they refer to column below.

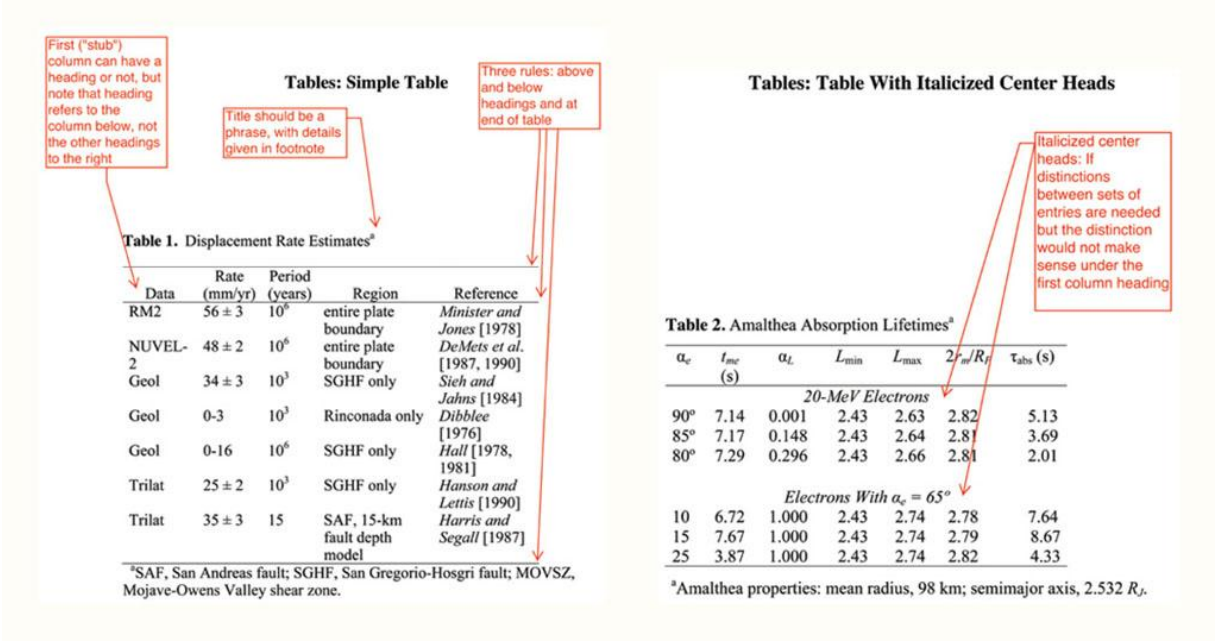
Format

- Each entry in a table should appear in a new cell.
- Avoid tables created with the tab key and embedded objects. There can be no color in tables. Tables with pictures, color, or embedded objects must be submitted as figures. Use footnotes or bold and italics instead of color in a table.
- Tables must be editable and must not be embedded as pictures.
- Footnotes should be indicated by superscript, lowercase letters.

Numbering. Cite each table in numerical orderin text. Tables in the main body of the text should be numbered consecutively, not by section.

Appendix tables should be numbered separately from the body and should begin with the letter of the appendix (e.g., Table A1 for the first table in Appendix A).

Each table must be cited in text.



Tables: Double-Rule Tables

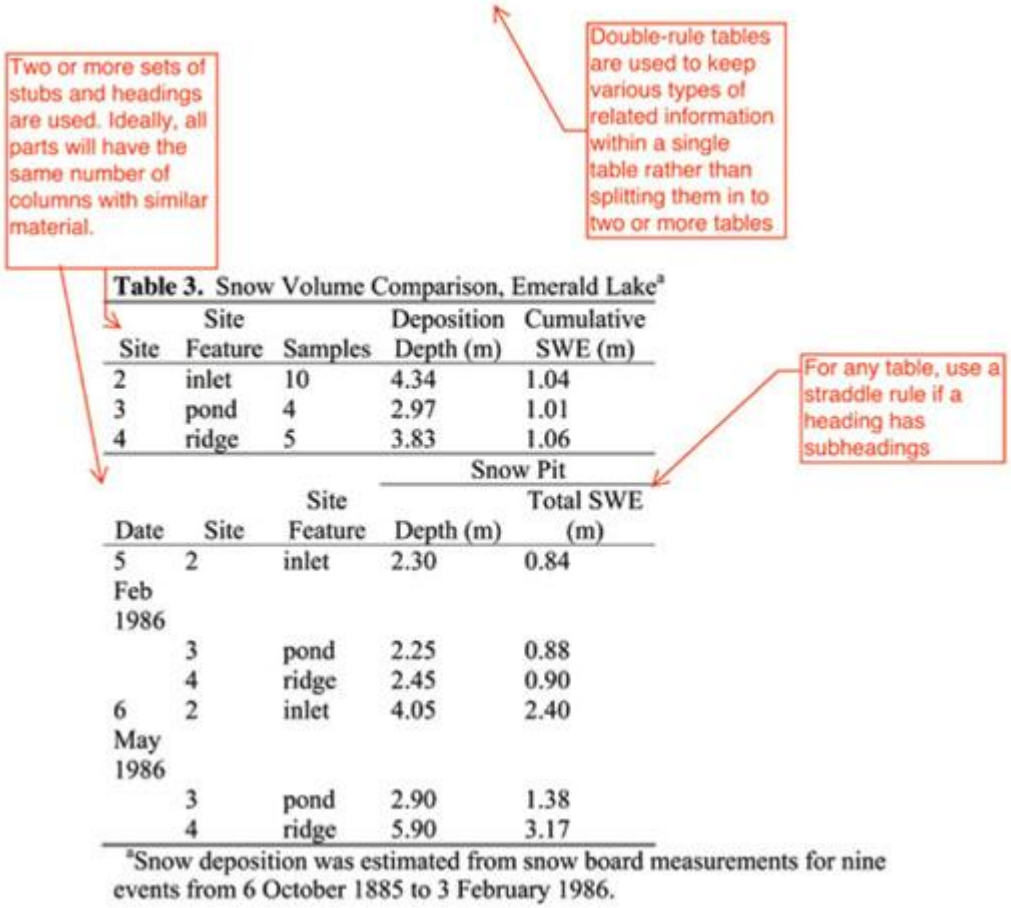


Table 3. Snow Volume Comparison, Emerald Lake[a]

Site	Site Feature	Samples	Deposition Depth (m)	Cumulative SWE (m)
2	inlet	10	4.34	1.04
3	pond	4	2.97	1.01
4	ridge	5	3.83	1.06

			Snow Pit	
Date	Site	Site Feature	Depth (m)	Total SWE (m)
5 Feb 1986	2	inlet	2.30	0.84
	3	pond	2.25	0.88
	4	ridge	2.45	0.90
6 May 1986	2	inlet	4.05	2.40
	3	pond	2.90	1.38
	4	ridge	5.90	3.17

[a]Snow deposition was estimated from snow board measurements for nine events from 6 October 1885 to 3 February 1986.

9. Figures

Refer to the Graphics Tab for accepted formats for submission, publication, and the archive.

For initial submission, each figure should also have a caption with the figure.

For revision submission, each figure must be uploaded separately without a caption, and for some journals a .pdf of all figures with their corresponding captions should also be included.

Format

• Indicate latitude and longitude on maps.

• Use lowercase letters to label parts of the figure; do not use Arabic or roman numerals.

• When possible, include the figure label in the top left corner of each plot.

• Do not include any information that could easily be included in the caption.

Captions. Provide list of captions in manuscript; do not include captions on the figures.

Numbering. Cite each figure in numerical order in text. figures in the main body of the text should be numbered consecutively, not by section.

Appendix figures should be numbered separately from the body and should begin with the letter of the appendix (e.g., figure A1 for the first figure in Appendix A).

Foldouts, pocket maps, etc., can be accommodated, but the costs for publishing these special features must be borne by the author. For additional information, contact the appropriate journal team. TOP

10. Copyrighted Material

Authors who use material (e.g., graphics, tables) from another author or copyright holder must obtain written permission to do so. This includes any figures redrawn but basically unaltered or with only slight modifications. Permission is not needed for material that originated in AGU journals or is in the public domain.

Permission must allow for the distribution of the material in any and all media in current and future formats.

Obtaining permission can be a lengthy process, so please make sure that you have the necessary permissions before you submit your manuscript to AGU.

Written permission(s) should accompany the revised manuscript when submitted. Articles will not be published until permissions are received at AGU. TOP

11. Supporting Material

See Auxiliary Material Guidelines for more information.

Please note that all auxiliary material must be reviewed with your manuscript.

In general, the purpose of the auxiliary material or electronic data supplements is to enable authors to provide and archive auxiliary nonprint information such as data tables, figures, video, or computer software, in digital formats so that other scientists can use it.

The key criteria are that the data:

• are central to the main scientific conclusions of the paper;

• are likely to be usable by other scientists working in the field;

• are described with sufficient precision that other scientists can understand them;

• have a relatively small volume (up to 50 megabytes); and

• can be put into one of the required digital formats.

A given article's auxiliary material consists of a small number <50mb of files, where each file contains either a text document, a table (data organized as rows and columns), a figure, or a video/multimedia file. The names and formats of these files follow simple standards designed to allow the publisher to archive the data, and scientists to read the data, for the indefinite future. The author transfers the files to AGU during the manuscript submission process using GEMS, or by anonymous FTP.

Movies, animations, downloadable data tables, calculation worksheets, and three-dimensional models are known as Dynamic Content. They allow authors to demonstrate, rather than simply explain, scientific findings. Files must therefore be in acceptable formats to guarantee long-term accessibility.

To learn more about the options, contact the appropriate journal team.